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2 January 1958

MEMORANDUM FOR: Special Assistant to the Director for Planning

SUBJECT: Estimate of Soviet Bloc High Altitude Interception Capabilities

REFERENCES: 1. T.S. 158851 dated 25 February 1957

2. DRAFT #3 Memorandum dated 2 October 1957

1. Our previous estimates on this subject were presented in the referenced memoranda. It is our intention in the present paper to deal primarily with significant differences in estimates made now as opposed to the early 1957 date of the earlier estimate.

Early Warning Detection and Tracking

2. On the basis of evidence largely accumulated or assessed in the last six months of 1957, we conclude that detection and tracking of intruding aircraft are assured throughout the Sino-Soviet Bloc with the following possible exceptions:

a. the central Siberian area bounded by the Arctic coastal strip on the north, the Urals on the west, the Trans-Siberian Railway on the south, and the Pacific Maritime Provinces on the east. We have very little information on which to make a firm judgment on this region.

b. the area east of Tashkent and south of the Trans-Siberian Railway extending into central China. In this case, our judgment is to some extent based on radar density and reaction to overflight.

The former area is largely devoid of critical military installations and, therefore, may remain relatively free of radar for some time. We do not expect the latter area to remain for long in its present near-radarless state.

Electronic Aspects of Ground Controlled Intercept (GCI)

3. Our previous estimate that the Soviets are fully capable of GCI has to some extent been strengthened by recent information. Soviet height finding capabilities appear much improved in many areas of the USSR with

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the introduction of ROCK CAKE height-finding radars fairly widely throughout the area covered during 1957 overflights. We believe there is no longer any reason for the Soviets not to know the altitudes at which Project operations have been conducted. Two new types of radar (STRIKEOUT, believed to be used with ROCK CAKE, and a modified TOKEN) should improve Soviet EW/GCI capabilities. We continue to believe that the Soviets have adequate airborne intercept (AI) radar for use in interception vehicles.

Interceptor Aircraft and Air-to-Air Missiles

4. As in the previous estimate, we have ruled out the possibility that rocket boosted or high altitude research aircraft might represent a threat.

5. Considering that the Soviets in July 1956 were given firm warning of what to expect and found themselves at that time unable to cope with the situation, we believe it highly likely that they would begin to modify one or more types of interceptors to obtain one with increased altitude capability. We have noted for some time Soviet interest in high altitude flights (up to 60-65,000 feet) by military aircraft though no evidence points to a specific modification program. Combat ceiling capabilities of four advanced Soviet interceptors are as follows: MIG-17 - 59,000 feet; MIG-19 - 61,000 feet; FACEPLATE - 61,000 feet; FITTER - 60,000 feet. Using the MIG-19, for example, in about a year delivery of a modified version able to reach a combat ceiling of 68-70,000 feet would be possible. Thus, with July 1956 as a starting date, delivery of such aircraft would be expected to begin as early as July 1957. We believe that the threat from such modified aircraft using simple armament is increasing rapidly in critical areas of the USSR and throughout 1958 will represent the principal physical hazard to operations. We emphasize, however, that this capability is little more than marginal and, bearing in mind the AI and GCI problems, luck will have to be on the side of the Soviets to carry out an interception by this means.

6. As lesser possibilities, we have considered (a) use of MIG-17 or MIG-19 aircraft at 55-60,000 feet as vehicles for launching air-to-air missiles from a "pull up" attitude; (b) use of supersonic interceptors "zoomed" to 70,000 feet or more, also for AA missile attack; and (c) use of nuclear warheads in air-to-air rockets. By the "pull up" technique, missiles might be launched so as to intercept targets up to about 68,000 feet, using stockpile missiles, or much higher using specially designed missiles. Primarily because of the complexities of the GCI, AI and missile

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guidance problems involved in such an attack, however, we believe kill probabilities would be low, although not negligible, during 1958. The "zoom" technique likewise has many inherent difficulties and the probability of successful use depends heavily on the number of aircraft which can be so employed. The technique involves essentially accelerating a supersonic interceptor, such as FACEPLATE or FITTER, to maximum speed at combat ceiling of about 60,000 feet and in an energy climb going to altitudes of probably 70,000 feet or more. Techniques for this purpose are difficult, but not impossible, to master and we would expect the Soviets to utilize maneuvers such as this. For several reasons, we consider use of air-to-air rockets with nuclear warheads, though possibly effective, to be unlikely. Internal political considerations would render their use unlikely over populated areas, but they could conceivably be effective over such targets as Kapustin Yar or other test ranges. We have no information of such Soviet development. It is within their capability although protection of the pilot for such a high altitude attack might be difficult. We have discussed these possibilities in the belief that Soviet desire to accomplish interception would cause them to attempt any method which might lead to successful interception.

7. Summarizing the various possible hazards from aircraft and AA missiles, we believe that time is running out for operations at 70,000 feet or less, and possibly somewhat above this level. A stiffening of defenses, first around the key targets, can be expected from now on. We likewise believe that we can expect to see Soviet aircraft operating at or near the altitudes employed by the Project vehicle. We believe, however, that the chance of successful Soviet interception is low, except as otherwise noted herein, and will continue to be so throughout 1958.

#### Surface-to-Air Missiles

8. As we pointed out previously, we believe that the Soviets would find it difficult to operate the present Moscow surface-to-air missile at 70,000 feet and above, and we do not believe such missiles will pose a serious threat to operations before the middle or close of 1958.

9. Beginning with 1959, however, we believe the Soviets will introduce a SAM missile with considerably increased altitude and range capabilities. This missile will appear first in the Moscow region, where an extensive SAM launching complex of about 60 sites exists now, and possibly also around Leningrad where similar launching facilities are under construction.

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Areas of Special Consideration

10. We continue to believe that in the environs of Moscow the Soviets would employ the most advanced techniques of which they are capable and, accordingly, we consider this to be the most hazardous area for operations. It is particularly true of this area that the chances of successful operation increase with increase in altitude.

11. We believe that the region east of Stalingrad (Kapustin Yar - Vladimirovka), where we know that missile development of many types, including surface-to-air, is conducted and which is adjacent to experimental aircraft testing facilities, is also one in which Soviet intercept capabilities may be high. No other areas, with the possible exception of Leningrad, are known to rank with these two insofar as surface-to-air missile countermeasures are concerned.

Concluding Remarks

12. In summary, we believe that:

- a. detection and tracking of the vehicle are virtually assured.
- b. specially designed aircraft capable of operating at or near 70,000 feet are now, or shortly will be, available to the Soviets in limited numbers. These aircraft could possibly conduct successful interception at or near 70,000 feet.
- c. the combination of Soviet interceptors, using "zoom" and "pull up" techniques, and air-to-air missiles now poses a growing threat around highly sensitive target areas.
- d. SAM missiles, now deployed around Moscow and possibly Leningrad, will have a low kill capability versus the Project vehicle up to early 1958, but this capability will increase and could become serious by 1959.
- e. many of our highest priority targets must now be considered defended areas against operations conducted below 70,000 feet.

13. We suggest that operational planning take into account the change in the picture which we have outlined above. It appears that some sacrifice of "take" may be necessary to preserve the operation. It may become necessary to make more frequent changes in course in order to throw

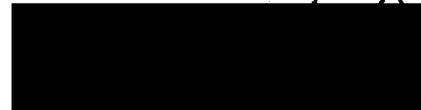
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off interception. More careful selection of routes to and from target areas may also be required. We believe some such changes will be necessary if chances of interception are to be minimized.

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Assistant Director  
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